

GROWING OF HOMOGENEOUS CRYSTALS BY BOTTOM SOLID FEEDING

ABSTRACT OF THE DISCLOSURE

Crystals of doped semiconductors and alloys are grown in a

5 Czochralski process utilizing a single crucible. An upper heater around the crucible applies heat to an upper portion of the crucible while a lower heater below the upper heater applies heat to a lower portion of the crucible independently of the upper heater. A solid feed material in a lower portion of the crucible is maintained by the lower heater at a temperature below the melting point of the feed material,

10 while the upper heater maintains an upper portion of the crucible at a higher temperature to provide a melt of the feed material in the upper portion of the crucible. A crystal grown from a seed introduced into the melt is drawn upwardly from the melt, and through a liquid encapsulant layer for a liquid encapsulated Czochralski process, and the crucible is displaced relative to the upper and lower

15 heaters to bring additional portions of the solid feed material into the higher temperature region of the upper heater to replenish the melt drawn out with the formed crystal, avoiding spatial segregation of dopants or of constituents of an alloy.